

(19) World Intellectual Property  
Organization  
International Bureau



(43) International Publication Date  
12 May 2005 (12.05.2005)

PCT

(10) International Publication Number  
**WO 2005/043450 A1**

(51) International Patent Classification<sup>7</sup>: **G06K 9/00**

(21) International Application Number:  
PCT/AU2004/001507

(22) International Filing Date: 29 October 2004 (29.10.2004)

(25) Filing Language: English

(26) Publication Language: English

(30) Priority Data:  
2003905991 31 October 2003 (31.10.2003) AU

(71) Applicant (for all designated States except US): THE  
UNIVERSITY OF QUEENSLAND [AU/AU]; QLD  
4072 (AU).

(72) Inventor; and

(75) Inventor/Applicant (for US only): GATES, Kevin, E.  
[US/AU]; Unit 1, 24 Oxford Terrace, Taringa, QLD 4068  
(AU).

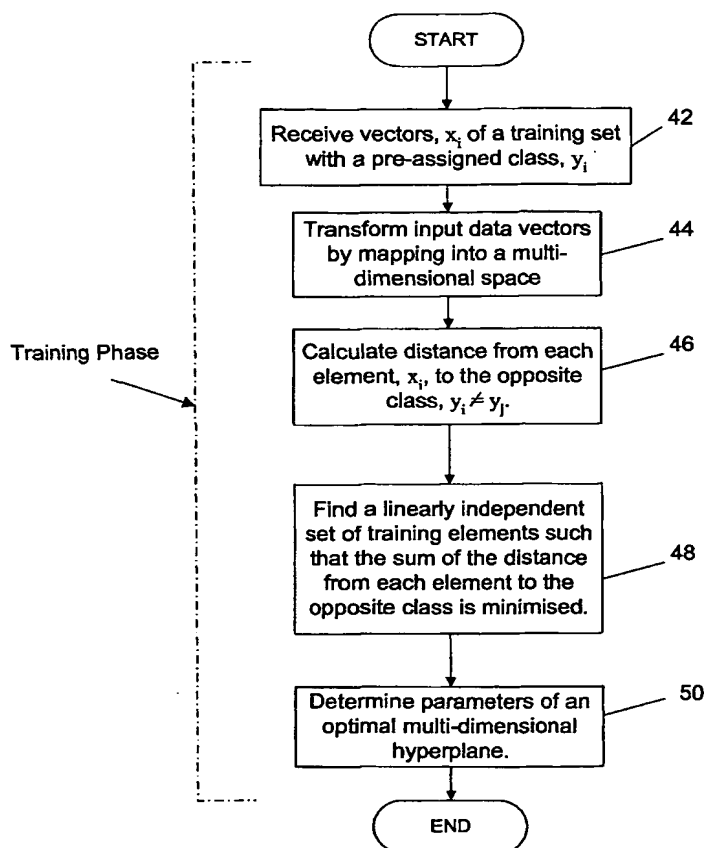
(74) Agent: EAGAR & BUCK PATENT AND TRADE  
MARK ATTORNEYS; PO Box 509, Spring Hill, QLD  
4004 (AU).

(81) Designated States (unless otherwise indicated, for every  
kind of national protection available): AE, AG, AL, AM,  
AT, AU, AZ, BA, BB, BG, BR, BW, BY, BZ, CA, CH, CN,  
CO, CR, CU, CZ, DE, DK, DM, DZ, EC, EE, EG, ES, FI,  
GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE,  
KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD,  
MG, MK, MN, MW, MX, MZ, NA, NI, NO, NZ, OM, PG,  
PH, PL, PT, RO, RU, SC, SD, SE, SG, SK, SL, SY, TJ, TM,  
TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, YU, ZA, ZM,  
ZW.

(84) Designated States (unless otherwise indicated, for every  
kind of regional protection available): ARIPO (BW, GH,  
GM, KE, LS, MW, MZ, NA, SD, SL, SZ, TZ, UG, ZM,  
ZW), Eurasian (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM),  
European (AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI,

[Continued on next page]

(54) Title: IMPROVED SUPPORT VECTOR MACHINE



(57) Abstract: A method for operating a computer as a support vector machine (SVM) in order to define a decision surface separating two opposing classes of a training set of vectors. The method involves associating a distance parameter with each vector of the SVM's training set. The distance parameter indicates a distance from its associated vector, being in a first class, to the opposite class. A number of approaches to calculating distance parameters are provided. For example, a distance parameter may be calculated as the average of the distances from its associated vector to each of the vectors in the opposite class. The method further involves determining a linearly independent set of support vectors from the training set such that the sum of the distances associated with the linearly independent support vectors is minimised.

WO 2005/043450 A1



FR, GB, GR, HU, IE, IT, LU, MC, NL, PL, PT, RO, SE, SI, SK, TR), OAPI (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG).

*For two-letter codes and other abbreviations, refer to the "Guidance Notes on Codes and Abbreviations" appearing at the beginning of each regular issue of the PCT Gazette.*

**Published:**

— *with international search report*